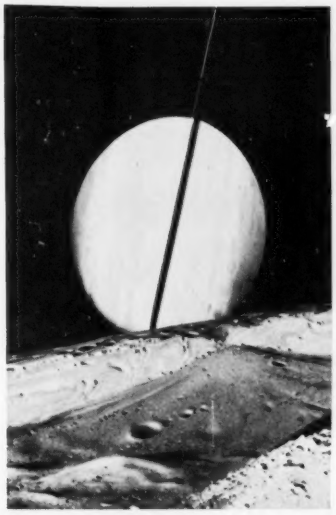
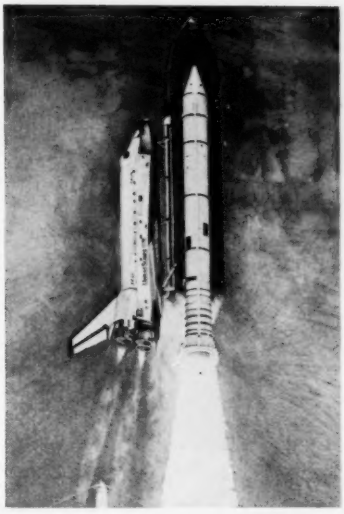
NASA Activities

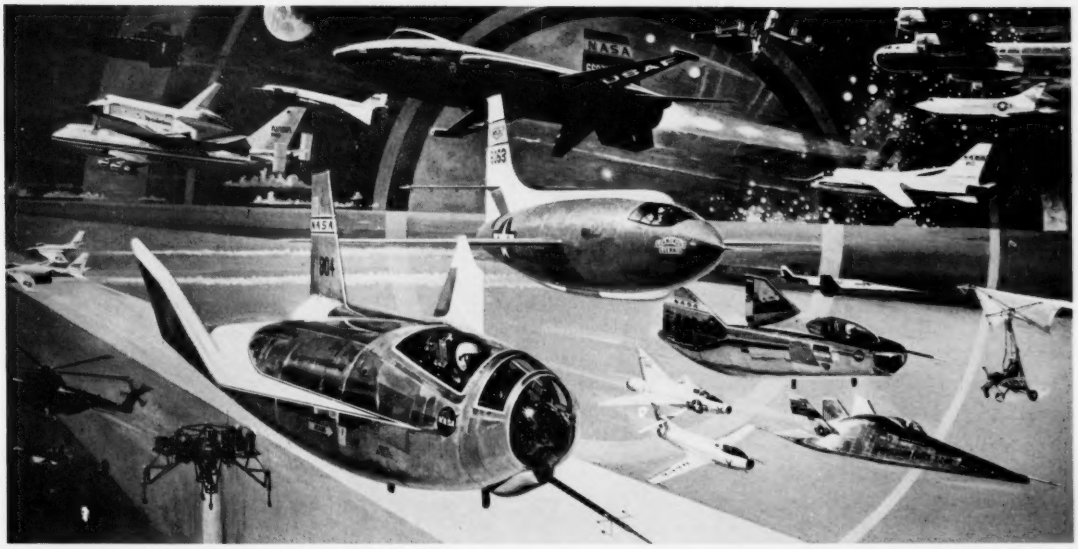
National
Aeronautics and
Space
Administration

25th Anniversary
1958-1983

October 1983
Vol. 14, No. 10







About the Cover

In the early days of NASA it was known that space activities would be documented widely in still photographs and motion pictures. James E. Webb, NASA's second administrator, saw the need to record the "spirit as well as the sights of the space age."

The NASA Art Program was instituted at Webb's recommendation in 1962 with the goal of collecting a unique documentation of America's advance into space and providing a special contribution to the history of American art.

Nationally known artists are invited to visit NASA sites and record their perceptions in drawings and paintings, which are then donated to the government. Each artist's personal vision of an event is conveyed in his or her particular style and becomes a part of this documentary history of the space age. The NASA Art Program serves as a vehicle to garner a unique archives of one of America's most exciting periods.

Top left: "Command Destruct Center" by Paul Calle, 1967, depicts a group of antennae dotting the Cape Canaveral area in Florida.

Top center: "View from Mimas" by Ron Miller, March 1981, the first painting illustrating known features on a Saturnian satellite and the first to interpret the features shown in the Voyager photographs of Mimas.

Top right: "Flumes" by Chet Jezierski, June 27, 1982, STS-4 has cleared the Service Tower in its powered ascent atop a pillar of flames. In this view from a remote camera site near the launch pad, the artist emphasized the many elements of the conflagration which results from a Space Shuttle liftoff.

Bottom: Artist Bob McCall, 1977, painted this large mural depicting the history of aeronautical research. The mural is on display at the Visitor Center at Dryden Flight Research Facility in California.

Contents

Administrator's Column 3
Shuttle Mission 8—Pictorial Highlights 4
NASA's 25th Anniversary Historical Calendar 10
Equal Opportunity Program News 10
Shuttle Crews Selected 11
NASA Book Hits Best-Seller List 12
NASA Becomes a Sponsor of Junior High School Math Competition 12
What's New in NASA Television and Radio Programming 13
Contractor News 13
Did You Know? 14
Astronaut Truly Named Commander of Naval Space Command 14
Government-Industry Executive Exchange 15
25th Anniversary Celebration at Washington Cathedral 15
NASA and Fairchild Sign Joint Endeavor Agreement for Leasecraft 16
Major Jet Fuel Savings With Energy Efficient Engine Technology 17
NASA Selects Small Business Research Proposals 18
Patents for Inventions from NASA Research 19
Expendable Launches for 1983 19
Space Shuttle Launches for 1983 19
Another Dividend from Air and Space 20

NASA Activities is published monthly by the National Aeronautics and Space Administration for the information of the agency's employees. Contributions and recommendations are solicited from headquarters and field centers, and should be addressed to Editor, NASA Activities, Office of Public Affairs, Code LFD-10, Washington, D.C. 20546. Material submitted for publication cannot be returned.

Distributed free of charge only to current agency employees. Available by subscription via the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Check or money order should be made payable to Superintendent of Documents, GPO. Subscription rates are $20.00/year domestic; $25.00/year, foreign.

Barbara Selby
Code LFD-10
NASA Headquarters, FOB 6
Washington, D.C. 20546
Phone: (202) 755-8348

Administrator's Column

"We celebrate 25 years of reaching for excellence and achieving it in space and aeronautics. The nation's investment in our work has produced a steady stream of new technological discoveries which have benefited everyone on earth. And the returns on this investment will be even greater in the future as we continue our work."

—James M. Beggs.

Our First Quarter Century of Achievement — Just the Beginning

We did not get to our present position of leadership in space by accident.

We got there because we had the imagination to dream great dreams and the national will to fulfill them.

We got there because the partnership of government, industry and our universities, built up over the years, created a scientific and high technology base second to none.

We got there for the good common sense reason that we have learned to build on our achievements as we go along—and to learn from our experience. As Shakespeare wrote: "Experience is by industry achieved and perfected by the swift course of time."

We have had our struggles and our successes in the program over the swift course of NASA's 25-year lifetime. And they have been open for all the world to see, beginning with the launch of our first satellite, Explorer 1. They range from the succession of planetary explorers—the Mariners, the Pioneers, the Vikings and the Voyagers; through the Mercury, Gemini and Apollo programs to the development of the Shuttle.

All would never have been possible had we not built on past experience. And, largely because we have done so, we became the leaders.

With the Shuttle, we are making dramatic and timely progress in learning to live and work in space. It is a truly impressive vehicle, and as time goes on, we are finding that its performance surpasses even the expectation of its designers.

But the Shuttle allows us to stay in space for only a short time. And while we can extend that time to about a month, we cannot extend it to long-duration, long-endurance space flight.

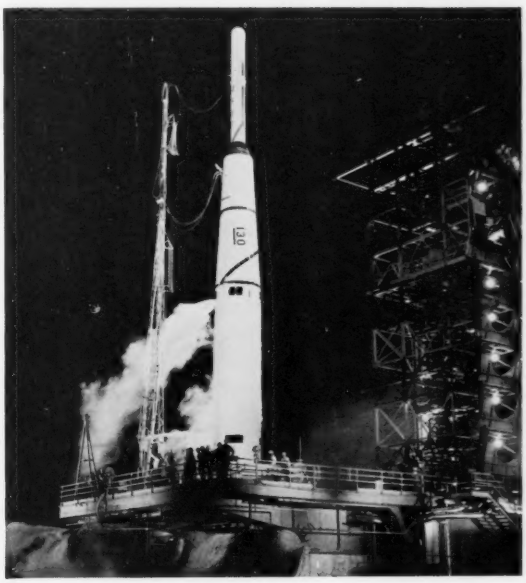
To do work of long duration, to do all the things we have always dreamed of doing beyond low earth orbit, we will need a space station.

I believe that a Space Station is, indeed, an idea whose time has come. Sooner or later, this country is going to take the next logical step in space and will build one.

And the sooner we do so, the better it will be for us, because a space station is essential if we are to maintain our preeminence.

I see a Space Station as an essential stepping stone to the future. With it, and with the use of an orbital transfer vehicle, which we will ultimately develop to move us to geosynchronous orbit, we will be able to operate routinely some 22,000 miles above the earth. And from there, perhaps we will begin to realize Wernher von Braun's great dream of going back to the moon to build a base, and from that base, mounting a manned expedition to Mars.

I believe that we will be able to accomplish all of these things within the next 25 years so that when NASA celebrates its Golden Anniversary in the year 2008, we will look back on our first quarter century of achievement as just the beginning.



NASA'S First Launch—Pioneer 1 was launched Oct. 11, 1958, from Cape Canaveral, Fla., aboard Thor Able 1. Although it failed to reach the moon, the spacecraft transmitted 43 hours of data.

Shuttle Mission 8—Pictorial Highlights

Crew . . . . . Richard H. Truly, commander
Daniel C. Brandenstein, pilot
Dale A. Gardner, mission specialist
Guion S. Bluford Jr., mission specialist
William E. Thornton (M.D.), mission specialist

Orbiter . . . . . Challenger (OV-099)

Challenger arrival at Kennedy Space Center (for launch preparation) . . . . . June 29, 1983

Time in Orbiter Processing Facility . . . . . 26 days, June 30-July 27, 1983

Rollover to Vehicle Assembly Building . . . . . July 27, 1983

Rollout to launch pad . . . . . Aug. 2, 1983

Launch date and time . . . . . Aug. 30, 2:32 a.m. EDT

Launch site . . . . . Kennedy Space Center, Fla. Launch Pad 39A

Landing site . . . . . Edwards Air Force Base, Calif. Runway 22

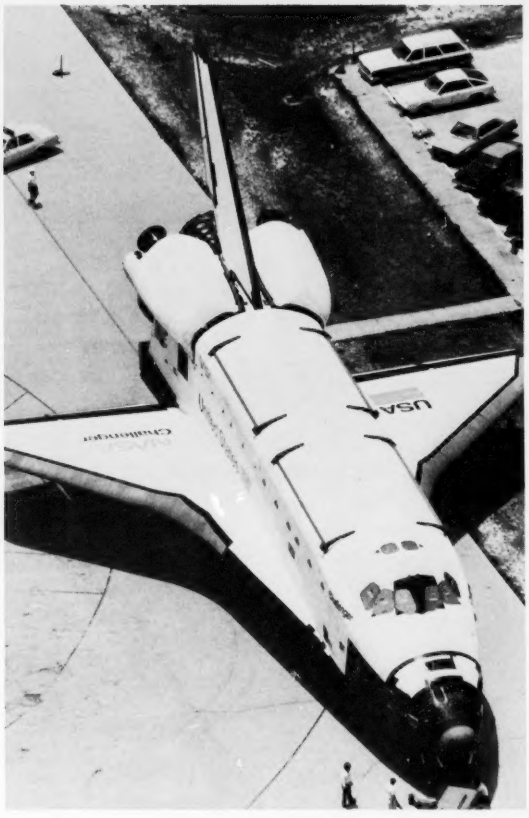
Landing date and time . . . . . Sept. 5; 3:40:43 a.m. EDT

Mission duration . . . . . 6 days, 1 hour, 8 min., 40 sec.

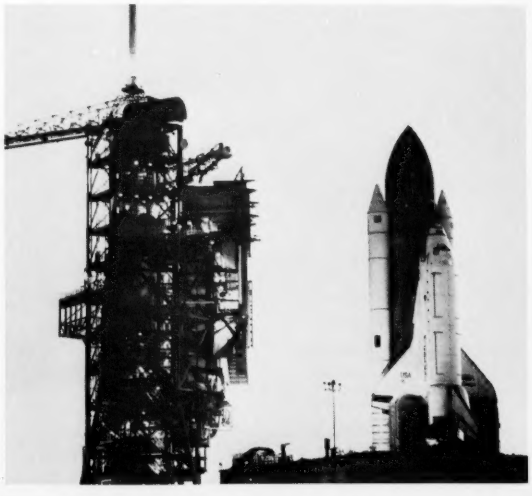
Orbits . . . . . 97 orbits; deorbit burn on 98th orbit

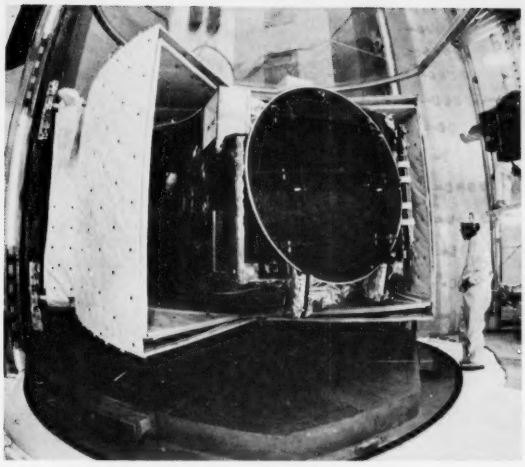
Payload deployment . INSAT-1B (Indian National Satellite)
Aug. 31, flight day 2
3:38 a.m. EDT

Mission firsts . . . First night launch of Space Shuttle
First night landing of Space Shuttle
First black American in space (Bluford)
First use of Payload Flight Test Article
First Space Shuttle on-orbit press conference

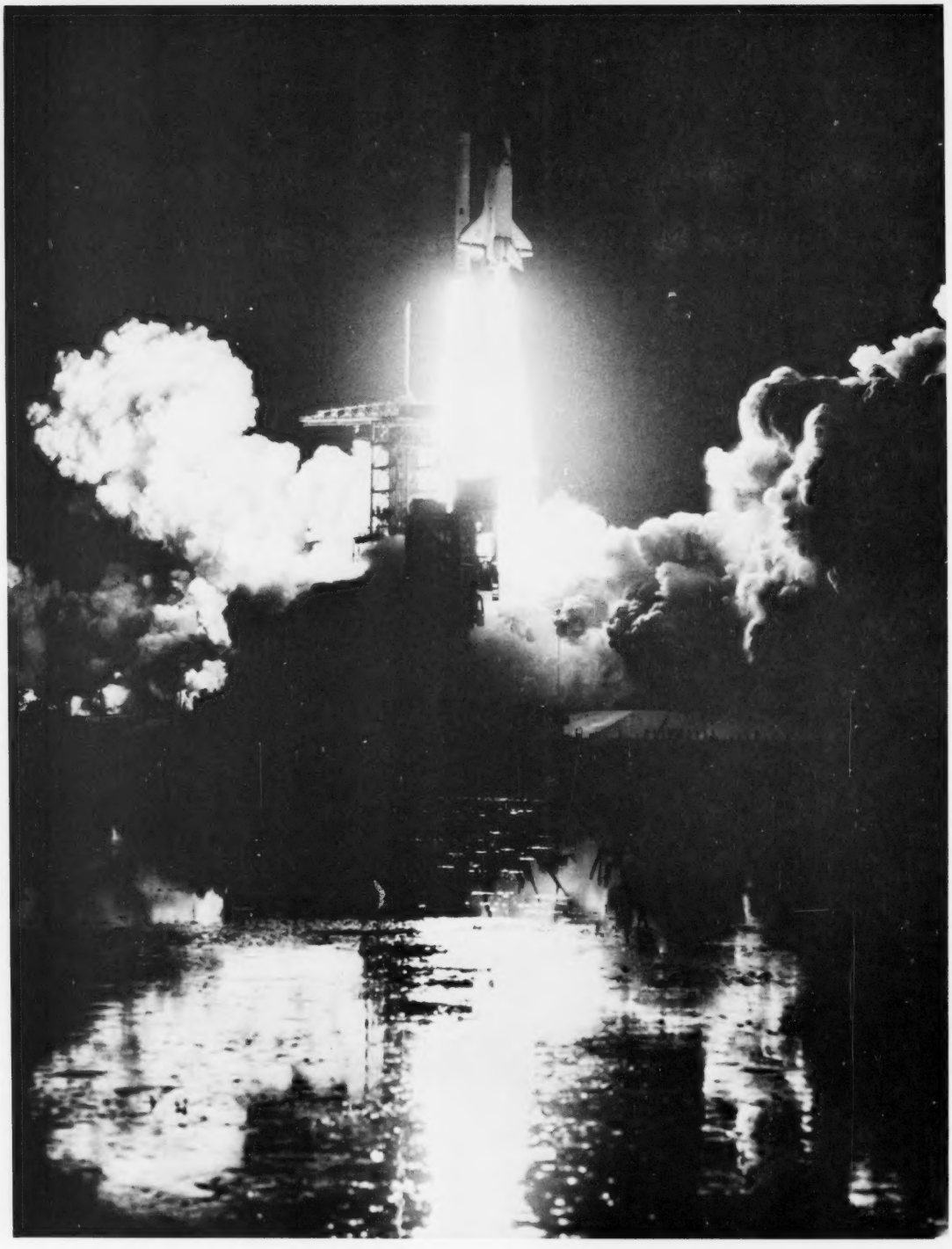


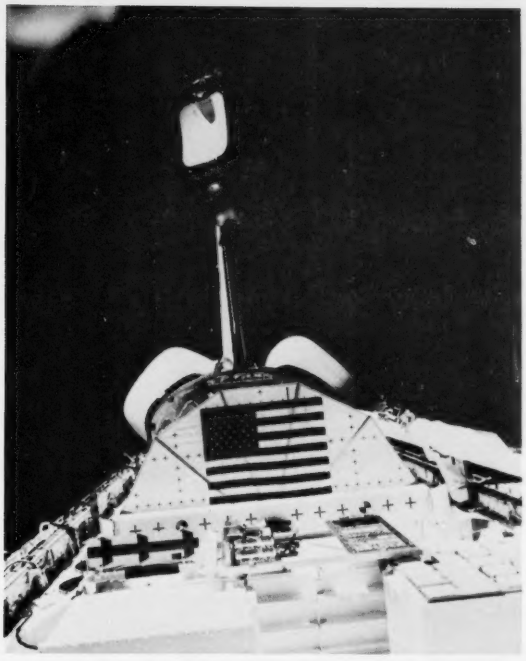
STS-8 rollover from Orbiter Processing Facility to Vehicle Assembly Building July 27 (above). STS-8 arrival at pad Aug. 2.

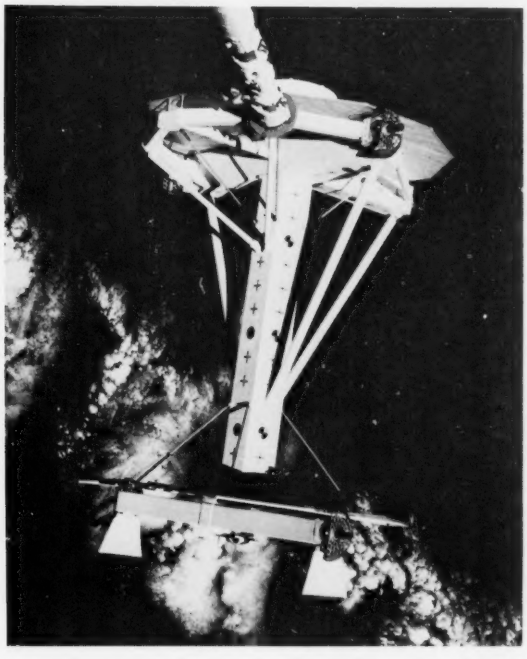




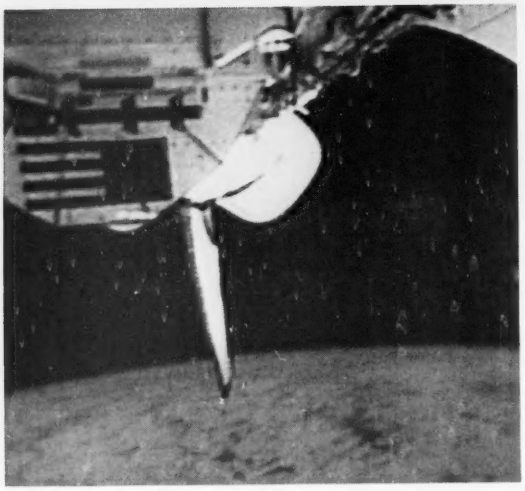
INSAT-1B in Payload Changeout Room at Pad 29A (upper left); STS-8 crew at breakfast prior to launch (left center); STS-8 crew departure for launch pad (lower left); STS-8 lights up the predawn sky with the first nighttime launch of the Space Shuttle at 2:32 a.m. EDT, Aug. 30.

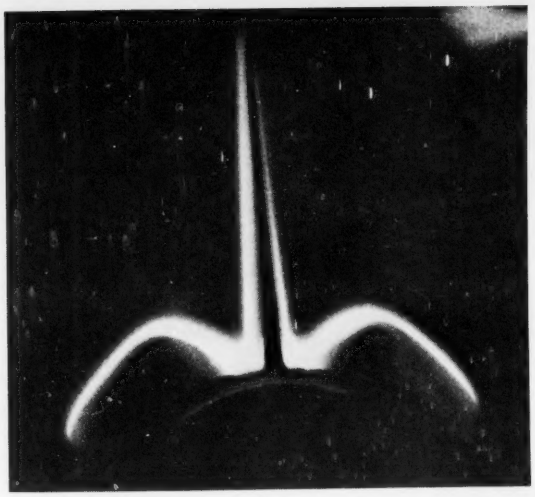


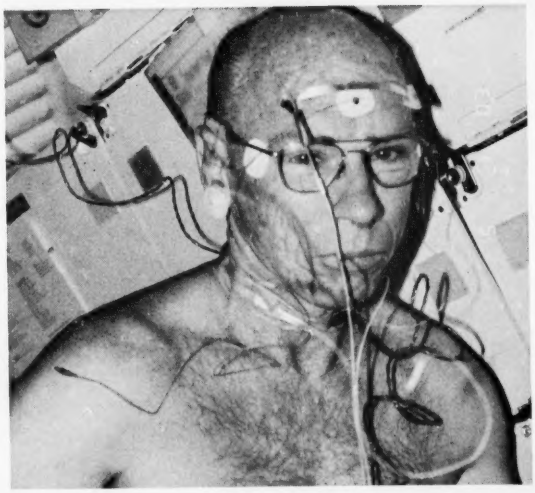




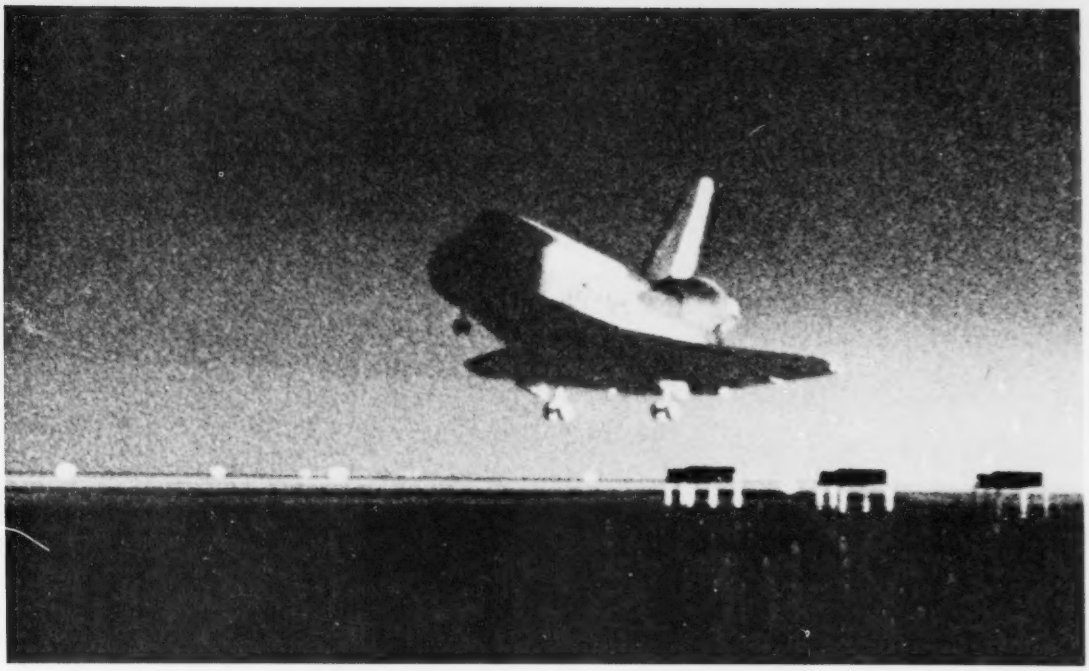
INSAT-1B is deployed at 3:38 a.m. EDT, Aug. 31. (upper left); barbell-shaped Payload Flight Test Article is suspended on the end of the remote manipulator system over scantily-clouded Atlantic waters (lower left); Bluford checks out sample pump on the Continuous Flow Electrophoresis System experiment in mid deck (upper right); Truly and Bluford in rest session (lower right).



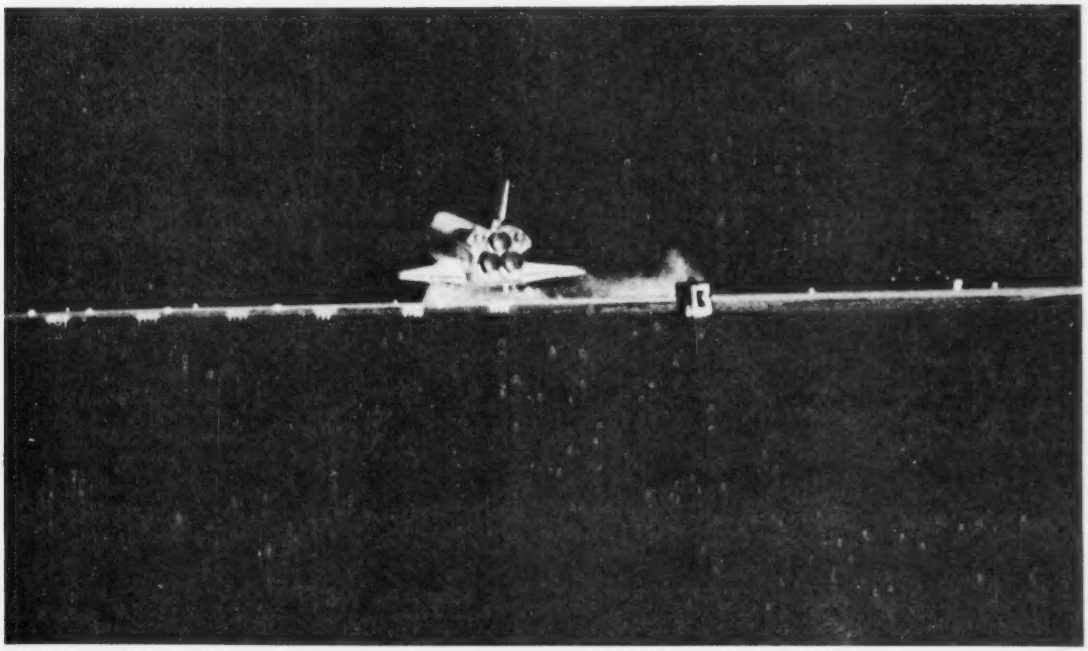




NASA's first test with the Tracking and Data Relay Satellite provided this scenic view of part of STS-8 backdropped against a black sky above the cloud-covered earth (upper right); this glowing scene was provided by a long duration exposure with a 35mm camera aimed toward the tail of Challenger (upper right); Thornton undergoes self-conducted medical testing; (below) first Space Shuttle on-orbit press conference. Participants (left to right): Gary Schwitzer, Cable News Network; Morton Dean, CBS; Roy Neal, NBC; Lynn Sherr, ABC; Howard Benedict, Associated Press; and Al Rossiter, United Press International. In the monitor, Bluford (upper right) responds to a question.



STS-8 prepares to land on a lighted Runway 22 at Edwards Air Force Base in California on Sept. 5; (below) touchdown at 3:40 a.m. EDT.



NASA's 25th Anniversary, Oct. 1, 1983
Historical Calendar for October

Date	Event
Oct. 1, 1958	NASA open for business
Oct. 1, 1969	Launch of ESRO 1B
Oct. 2, 1962	Launch of Explorer 14
Oct. 2, 1966	Launch of ESSA 3
Oct. 3, 1962	Launch of Mercury Atlas 8 (Sigma 7; Walter M. Schirra)
Oct. 3, 1964	Launch of Explorer 21
Oct. 3, 1967	Fastest flight of X-15 (William "Pete" Knight)
Oct. 3, 1968	First pocket powered flight of a wingless lifting body (John Manke)
Oct. 3, 1968	Launch of ESRO 1A
Oct. 4, 1959	Little Joe 6 suborbital Mercury capsule test
Oct. 4, 1960	Scout 2 launch vehicle development test
Oct. 6, 1975	Launch of Explorer 54
Oct. 6, 1981	Launch of Solar Mesosphere Explorer
Oct. 7, 1958	Project Mercury organized
Oct. 9, 1964	Launch of Explorer 22
Oct. 10, 1974	Launch of Westar 2
Oct. 11, 1958	Launch of Pioneer 1
Oct. 11, 1968	Launch of Apollo 7 (Walter M. Schirra, Donn F. Eisele and Walter Cunningham)
Oct. 12, 1976	First flight of Rotor Systems Research Aircraft
Oct. 13, 1959	Launch of Explorer 7
Oct. 13, 1978	Launch of TIROS N
Oct. 14, 1965	Launch of OGO 2
Oct. 14, 1970	X-24A first supersonic flight
Oct. 14, 1976	Launch of Marisat 3
Oct. 15, 1972	Launch of NOAA 2
Oct 15, 1972	Launch of Oscar 6
Oct. 15, 1974	Launch of Ariel 5
Oct. 16, 1975	Launch of GOES 1
Oct. 18, 1962	Launch of Ranger 5
Oct. 18, 1967	Launch of OSO 4
Oct. 21, 1971	Launch of NOAA 2
Oct. 22, 1977	Launch of ISEE 1 and 2
Oct. 23, 1958	Launch of Beacon 1
Oct. 23, 1968	HL-10 first powered flight
Oct. 24, 1968	Final flight of X-15 (Bill Dana)
Oct. 24, 1978	Launch of Nimbus 7
Oct. 25, 1966	Atlas Centaur 9 test
Oct. 25, 1973	Launch of Explorer 50
Oct. 25, 1974	X-24B fastest flight
Oct. 26, 1966	Launch of Intelsat II-A
Oct. 27, 1961	Saturn launch vehicle development test
Oct. 27, 1962	Launch of Explorer 15
Oct. 27, 1982	Launch of RCA 5
Oct. 30, 1964	First flight of the Lunar Landing Research Vehicle, forerunner to the Lunar Lander (Joe Walker)
Oct. 30, 1973	Launch of Navy Transit satellite
Oct. 30, 1979	Launch of Magsat
Oct. 31, 1980	Launch of FLTSATCOM 4

NASA Equal Opportunity Program News

This article is the first of its kind that will appear in the *NASA Activities* periodically throughout the year sharing information related to equal opportunity. NASA employees wishing to contribute information or suggestions for future articles may submit input to the NASA Office of Equal Opportunity Programs, Code UI-1, Attn: Lynda Sampson, Washington, D.C. 20546.

The week of Oct. 2-8, 1983, has been designated as National Employ the Handicapped Week. NASA installations will observe the week by developing various programs and activities to recognize the many contributions and accomplishments of handicapped individuals at NASA and throughout the United States.

Members of President Reagan's Cabinet and heads of other government departments pledged in a joint statement on Sept. 20, 1983, to continue hiring, training, and promoting handicapped men and women in the federal government and to increase efforts to assist handicapped Americans to develop "needed skills through employment and volunteer opportunities."

NASA is strongly committed to increasing its representation of handicapped employees and each installation has established hiring goals. In FY 1983, the goal was to hire 16 severely handicapped employees agencywide. This goal was met Aug. 31, 1983.

Congratulations are given to Constance R. Alexander, Employee Relations Specialist at Johnson Space Center, Houston, Texas, who was recently selected by a Headquarters Awards Panel as NASA's Outstanding Handicapped Federal Employee for 1983. Alexander was presented a certificate signed by President Reagan and Dr. Donald Devine, Director, Office of Personnel Management, in recognition of her many achievements as an outstanding Johnson Space Center employee and for her significant contributions to her community.

Shuttle Crews Selected

Astronaut crews for two upcoming Space Shuttle flights have been selected by the National Aeronautics and Space Administration.

The flights are scheduled to occur in June and August 1984 according to the current flight manifest.

Since some reordering of flights may occur, beginning in 1984, crews will be announced by payload assignment rather than an STS number. Mission designations consist of a numerical prefix indicating the year in which launch is to occur, a numerical designator for the launch ("1" for a KSC launch and "2" for a Vandenberg AFB launch), and a letter suffix which reflects the originally scheduled order of launch. Mission 41-D, for example, is a 1984 launch—"4"; to occur at KSC—"1"—and was originally manifested as the fourth mission of that fiscal year—"D." If the launch moves in the sequence, the mission designator will not change.

Commander of the 41-E mission will be Karol J. Bobko, Colonel, USAF, 45, of Gulf Harbors, Fla. He was pilot on the sixth Shuttle flight in April. Other crew members will be Donald E. Williams, Commander, USN, 41, of Lafayette, Ind., pilot; and as mission specialists, Dr. Rhea Seddon, M.D., 35, of Murfreesboro, Tenn.; Jeffrey A. Hoffman, Ph.D., 38, Brooklyn, N.Y.; and S. David Griggs, 43, Lawrence, Mich.

The 41-E payloads are to be the commercial satellites TELESAT and SYNCOM IV-1, a Large Format Camera, and a multi-purpose experiment support structure launch is forecast for June 6, 1984, and is to be the second flight of the orbiter, Discovery.

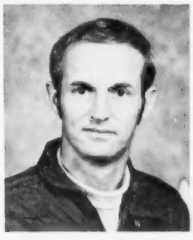
Payload 41-F will be a Department of Defense mission to be flown by the astronaut crew previously assigned to STS-10.

Commander of 41-G will be Frederick H. Hauck, Captain, USN, 42, of Winchester, Mass. He piloted the orbiter Challenger, on STS-7 in June. His crew will consist of David M. Walker, Commander, USN, 39, of Eustis, Fla., pilot; and mission specialists Dr. Anna L. Fisher, M.D., 33, San Pedro, Calif.; Joseph P. Allen, Ph.D., 46, Greencastle, Ind.; and Dale A. Gardner, Lt. Commander, USN, 34, Fairmont, Minn.

Allen is a veteran of a previous mission, having flown on STS-5 in November 1982. Gardner flew on STS-8 in August.

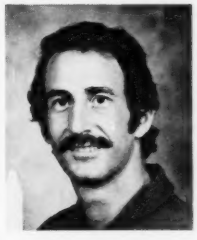
Cargo aboard this flight, which will also employ the orbiter Discovery, will be commercial satellites for TELSTAR, Satellite Business Systems, and Hughes Aerospace, and an astronomy experiment named SPARTAN. The projected launch date is Aug. 1.

Karol J. Bobko

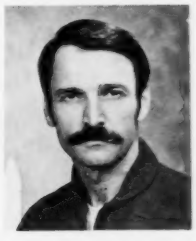


Donald E. Williams

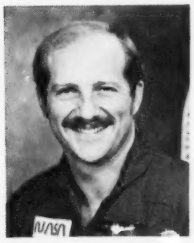
Rhea Seddon



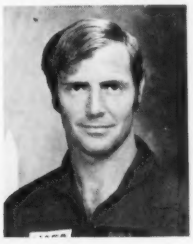
Jeffrey A. Hoffman



S. David Griggs



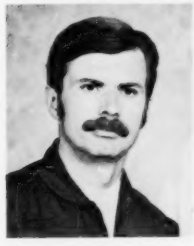
Frederick H. Hauck



David M. Walker

Anna L. Fisher

Joseph P. Allen



Dale A. Gardner

NASA Book Hits Best-Seller List

A NASA educational publication which describes for general readers the scientific discoveries made in space exploration has become a best-selling item at the U.S. Government Printing Office after less than a year. According to current GPO statistics, more than 110,000 copies of the well-written and beautifully illustrated *A Meeting With the Universe* have been sold since the book appeared last November, and another printing of 70,000 is already in the works to keep up with demand.

A Meeting With the Universe describes in nontechnical language the exciting and unexpected discoveries that we have made by exploring the universe with unmanned spacecraft, ground-based instruments, and the landings of Apollo astronauts on the Moon. Separate sections, written by individual NASA scientists, describe our achievements in the many different fields of space science: lunar and planetary studies, astronomy and astrophysics, life sciences, and the complex nature of the earth-sun relationships.

The book was edited by two NASA scientists, Dr. Bevan M. French and Dr. Steven P. Maran. French, who also wrote *The Moon Book* (published by Penguin Books in 1977), is the manager of NASA's research program on moon rocks and meteorites. Maran, located at NASA's Goddard Space Flight Center, is an astronomer who has written numerous popular articles on space science.

A Meeting With the Universe is an astonishingly successful experiment in popular writing by a group of scientists. "We deliberately tried a different approach in communicating space science to the public," French explained. "Instead of using a professional writer, who might not have a real familiarity with scientific details, we looked for scientists who had a good feeling for the details of everything that had been going on and who could also write well for nonscientists. We were very lucky in finding people with the right combination of background and writing skills."

Besides French, who wrote the introductory chapters and the chapter on planetary exploration, "The New Worlds," the other authors of chapters in the book all come from NASA Headquarters. They are: Dr. Eric Chipman, "The Sun and Earth in Space;" Dr. David Gilman, "Beyond the Solar System;" Dr. Paul Rambaut, "The Human Element;" and Dr. Donald DeVincenzi, "Life in the Universe." In addition to its seven chapters, the book contains more than 200 illustrations, mostly in color, and its 221 pages include an appendix of space discoveries which is proving useful for teachers, students and others with a deeper interest in the scientific details of space exploration.

The quality of *A Meeting With the Universe* was underscored last June, when the book received the annual Blue Pencil Award from the National Association of Government Communicators as the best book published by the U.S. Government in 1982. A more impressive demonstration of its effectiveness, and of the continuing high public interest in space activities, has been the rapidly climbing sales figures, 110,000 copies in only ten months.

A Meeting With the Universe sells for $14.00 in a softcover edition. It is available through the Government Printing Office, and it is also being sold through several bookstore chains such as Waldenbooks and B. Dalton. At least one university professor has ordered several hundred copies to use as a textbook for a large and popular introductory science course.

To French, who edited the book as part of his NASA duties and receives no royalties, the rapidly growing sales figures are still a source of pleasure. "There have always been problems in communicating to the general public the wonderful things that have been happening in scientific discovery during the Space Age," he said. "All of us who worked on the book felt that we had really exciting things to tell and that people were interested about them. We all worked hard, and we're delighted that we are getting the message across."

NASA Becomes a Sponsor of Junior High School Math Competition

NASA has become a major sponsor of MATHCOUNTS, a national mathematics instruction and competition program for junior high school students.

NASA joins the National Science Foundation, CNA Insurance Companies, National Society of Professional Engineers and National Council of Teachers of Mathematics as a major sponsor of the program.

"MATHCOUNTS is generic to all the accomplishments and goals which NASA encourages for young people," said Administrator Beggs. "Our country's space program thrives on a continuing source of individuals adept in math and science. It was, therefore, the sensible thing to do when NASA decided to lend its support to MATHCOUNTS, because MATHCOUNTS will help prepare the next generation of skilled scientists and other high-technology-oriented professionals."

MATHCOUNTS is a nationwide effort to combine resources and sponsorship of education, industry and

business sectors to improve math literacy.

Objectives of the program are: to make math achievement rewarding and exciting and instill this image among seventh and eighth graders; to increase public awareness of the importance of math to the country's future; and to pave the way for improvements in math education curricula in junior high school.

The MATHCOUNTS program will begin in September and run through the school year. Students in participating schools will take an initial test to determine levels of competency and which areas need to be strengthened.

Teachers will use MATHCOUNTS learning aids to help students develop better math skills. A final test will be given to select representatives for the first round of competitions in February.

As part of its commitment, NASA will hold the national level MATHCOUNTS competition in May 1984 at its Goddard Space Flight Center, Greenbelt, Md.

During the national competition, NASA will arrange for a special tour of the Smithsonian's National Air and Space Museum for the 200 students participating from around the country.

NASA will host the four winning students and their teacher coaches to a Space Shuttle launch at Kennedy Space Center, Fla.

What's New in NASA Television and Radio Programming

Programs released in September.

Television

NASA . . . The 25th Year (a 50-minute documentary about NASA's aeronautics and space accomplishments)

Radio

Space Story (4½-minute programs)
NASA's First 25 Years . . . A Prelude to Tomorrow (featuring James M. Beggs, NASA Administrator, Headquarters)
The Shuttle Revolution (featuring Lt. Gen. James A. Abrahamson, Associate Administrator for Space Flight, Headquarters)
Searching for Life Elsewhere (featuring Dr. Gerald Soffen, NASA Headquarters, and John Billingham, Ames Research Center)
Adapting to the Space Environment (featuring Dr. Gerald Soffen, NASA Headquarters)

Special Report
Visions of the Future (15-minute program featuring Jesco von Puttkamer, NASA Headquarters)

Space Note (60 seconds)
NASA Satellite Discovers Possible Second Solar System

Copies of television tapes are sent simultaneously to all NASA Visitor Information Centers and Public Affairs Offices, and to 650 television stations nationwide as well as to 425 cable television systems via the satellite RCA-Cable net I. Five hundred television stations receive material formulated as a 4½-minute program; the remaining 150 stations receive a 90-second "spot"—a condensed version of the 4½-minute presentation.

NASA's radio programs are sent to approximately 3,500 radio stations across the nation; in addition, translations of the recordings are made by Voice of America and Radio Free Europe and these tapes are then released to the appropriate audiences overseas. Released each month are one report of 14½ minutes and four 4½-minute weekly stories (one story in the set is featured for one week of the month). Ten one-minute space notes are released quarterly.

Contractor News

NASA has selected **Lockheed Space Operations** of Titusville, Fla., for final negotiations of a contract to perform Space Shuttle launch and landing activities at Kennedy Space Center and Vandenberg Air Force Base in California, including operation of related ground systems at both sites. Lockheed's proposed cost for the initial six-year period is approximately $2 billion. The initial contract period is three years, with a one priced three-year option and three unpriced three-year options, for a total potential contract of 15 years. Fifteen contractors currently provide these services for NASA and the USAF. The Shuttle Processing Contract will consolidate these services into a single contractual arrangement that will permit the Space Shuttle launch processing cycle to evolve from a research and development phase into an operational mode in which mission success and safety will continue to be achieved. The overall contract for Shuttle processing services will be administered by NASA and will contain separate statements of work for KSC and VAFB which will be managed by NASA/KSC and the Air Force, respectively.

Goddard Space Flight Center has selected **ViON Corp.** of Washington, D.C., to provide replacement of two central processing complexes and a shared disk subsystem in support of the Networks Directorate at the center. The firm-fixed-price contract, to be negotiated, includes delivery of two central processing complexes, eight magnetic disk directors and 36 magnetic disk

storage actuators. The period of performance will run for a total of five years—a basic two-year period with three additional one-year options. Total price for the basic period, including purchase of hardware, maintenance, software, training and documentation will be negotiated at approximately $3.9 million. The total evaluated systems life cost, over five years, is expected to be approximately $4.6 million.

Boeing Services International, Inc., Cocoa Beach, Fla., has been awarded a cost-plus-fixed-fee contract for safety, reliability and quality assurance engineering support services at Johnson Space Center. The 36-month contract, beginning Oct. 1, 1983, has an estimated value of $29.48 million with a pre-priced three-month extension option valued at $2.397 million. The contract covers safety, reliability and quality assurance engineering for current and future JSC programs for space hardware, software, ground support facilities and for payloads including experiments.

Lewis Research Center has awarded a $20,936,700 contract to **Honeywell, Inc.** of Clearwater, Fla., for modifications to the Centaur launch vehicle in connection with its use as a high-energy upper stage in the Space Shuttle. The cost-plus-incentive/award fee contract is for the design, development, production, test and delivery of four inertial measurement groups. Primary function of each system is to maintain inertial reference and provide other information needed to guide the vehicle in space. First use of the reconfigured Centaur aboard the Shuttle is scheduled for the Galileo and Solar Polar International missions in 1986.

Did You Know?

The **First Annual Aircraft Controls Workshop** will be held at Langley Research Center in Hampton, Va., Oct. 25-27. Topics for the five workshop sessions include: Control System Design Requirements, Parameter and State Estimation and Optimal Guidance Techniques, Control System Design Techniques, Recent Experiences in Implementation of Advanced Control Systems, and Research Opportunities for the Future.

Lewis Research Center, Cleveland, Ohio, will sponsor a **NASA Communications Industry Briefing** at Cleveland Hopkins International Airport, Nov. 2-3. Briefing topics include: Advanced Communications Technology Satellites Review, Communications Systems Studies, Antennas, Travelling Wave Tubes, Ground Terminals and In-house Test Program.

Astronaut Truly Named Commander of Naval Space Command

Astronaut Richard H. Truly, commander of the STS-8 Shuttle flight, which landed Sept. 5, has been named as the first Commander of the Naval Space Command to be set up Oct. 1 at Dahlgren, Va.

Announcement of Truly's new post was made by Adm. James D. Watkins, USN, Chief of Naval Operations, and NASA Administrator James M. Beggs.

Truly, a Navy Captain, was selected as a NASA astronaut in August 1969.

The establishment of the Naval Space Command, which will centralize several Navy operational functions under a single commander to provide direct support to fleet units worldwide, was announced June 15 by Secretary of the Navy John Lehman.

The Naval Space Command will include the Naval Surveillance System with headquarters at Dahlgren, Va., the Naval Astronautics Group with headquarters at Point Mugu, Calif., and elements supporting the Fleet Satellite Communications System. It will function in full cooperation with the Air Force Space Command and other Department of Defense elements.

Captain Truly's first flight in space was as pilot of STS-2, Nov. 12-14, 1981. Although that mission was shortened from five to two days because of a failed fuel cell, the crew accomplished more than 90 per cent of the mission objectives.

Truly had been a member of the astronaut support crew and a capsule communicator for all three manned Skylab missions and the Apollo-Soyuz mission. He was a member of one of the two two-man crews for the Shuttle approach and landing test flights in 1977.

A native of Fayette, Miss., Truly received a bachelor of aeronautical engineering degree from Georgia Institute of Technology in 1959. He received his commission through the Naval Reserve Officer Training Corps (NROTC) program at Georgia Tech.

He completed naval flight training in 1960 and as a naval aviator had more than 6,000 hours in jet aircraft. He served aboard the USS INTREPID and USS ENTERPRISE and made more than 300 carrier landings.

Truly and his wife, the former Colleen Hanner of Milledgeville, Ga., are the parents of two sons and a daughter and make their home in Houston.

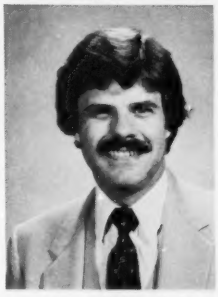
Government-Industry Executive Exchange

The President's Executive Exchange Program (PEEP) offers highly-selected employees from the Private and Federal sectors the opportunity to gain experience by crossing sector lines for a year. In addition to the work experience, the participants are involved in an education program that consists of a five-day September Public Policy Forum; a Spring 10-day International Study Conference; and a July three-day Business-Government Relations Conference.

For the current program year, September 1983 to September 1984, NASA has negotiated three exchange assignments; one from NASA to private industry and two from private industry to NASA.

Dr. C. Howard Robins, Jr., Chief, Mission Operations and Information Systems Branch, Earth and Planetary Exploration Division, Office of Space Science and Applications, is assigned as Director, Technological Forecasting for the Newport News Shipbuilding and Dry Dock Co. of Tenneco, Inc., reporting to the Vice President of Engineering. His assignment will involve the responsibility for developing recommendations concerning the enhanced utilization and expansion of the company research, design, engineering, and manufacturing capabilities in order to increase the scope of current product lines and identify potential avenues of product development. This will include the assessment of the company's current use of technology and product strategy; the identification and assessment of existing and future technology that could be used to enhance the company's product and competitive position; and the identification of new product development strategies based on existing and future technologies.

E. Jay Worrel, Director of Manufacturing Engineering for Vetco Offshore, Inc., a subsidiary of Combustion Engineering, Inc., is assigned to the Propulsion Directorate, Office of Space Shuttle Operations, Office of Space Flight. His assignment will involve the review of the plans and operations of several of the major shuttle propulsion contractors including those for the solid rocket booster, motor manufacturing and refabrication, solid rocket reassembly, external tank manufacturing and main engines. In addition to making recommendations to improve productivity, his assignment objective is to ensure that the tooling and the manufacturing process is adequte to support a 24 Shuttle flight schedule.



Eric Oganesoff, Manager of PEPCO's (Potomac Electric Power Co.) Residential Energy Services Department, is assigned to the Customer Services Directorate, Office of Space Flight. His assignment will involve the review of the initial NASA marketing plans and the recommendations for revision; the review of the structure of the Customer Services Directorate from a commercial viewpoint and the recommendations for the application of the common practices and techniques that industry uses to establish strong communication lines between sales and marketing activities; the investigation of new business development including joint endeavor and cooperative mission opportunities; the study of new market promotion techniques for possible NASA application; and the management of the development of a sales and marketing training program for NASA employees.

25th Anniversary Celebration at Washington Cathedral

The Washington National Cathedral will celebrate NASA's 25th Anniversary with a special interdenominational service on Oct. 23, 1983, at 5:30 p.m.

All NASA employees, their families and friends have been invited by the Bishop, Provost and Chapter of the Cathedral to participate in this event.

The program will begin with an Organ and Brass Prelude at 5 p.m., followed by the service which will include special guest speakers and music by the Cathedral Choir and the Choral Arts Society.

NASA and Fairchild Sign Joint Endeavor Agreement for Leasecraft

NASA and Fairchild Industries, of Germantown, Md., have signed a Joint Endeavor Agreement (JEA) which will lead to the demonstration of an unmanned space platform with the initial launch scheduled for 1987.

The platform, designated Leasecraft, will be deployed from the Space Shuttle and will provide a space platform or services to commercial and government users.

Under terms of the agreement, Fairchild Space Co., a division of Fairchild Industries, will design and develop the spacecraft. NASA will provide technical assistance, flight time on the Space Shuttle and equipment and facilities needed to support the development program.

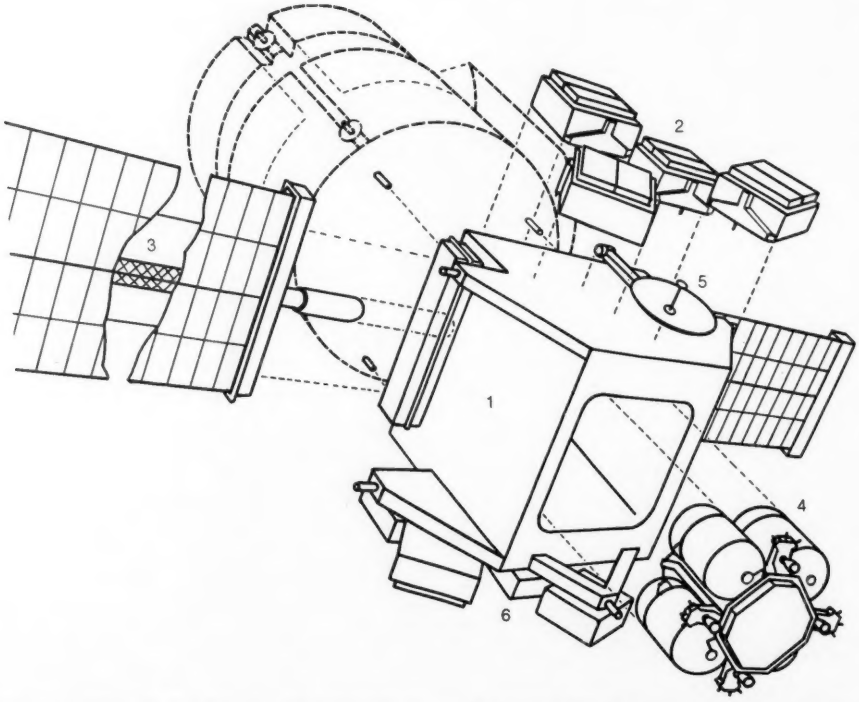
NASA Administrator James M. Beggs says the development of Leasecraft is consistent with the Administration's initiative to promote space exploitation by commercial firms.

Fairchild Industries estimates that it would cost in excess of $200 million to design and develop the Leasecraft.

A two-phase program has been agreed to by Fairchild and NASA; first, to survey the market potential and design and develop the flight hardware and ground support systems, and deploy Leasecraft from the Space Shuttle. During the second phase, there will be a service flight approximately six months after the deployment flight.

Fairchild will design and build the Leasecraft platform using technology derived from NASA's Multimission Modular Spacecraft (MMS). The firm was prime contractor during the development program of the MMS.

As envisioned by Fairchild, the Leasecraft will measure about 4.6 by 4.6 by 2.9 meters (15 by 15 by 9.5 feet) and will be equipped with power and command and data handling modules and other necessary equipment required by payloads. The service life of the low earth orbit Leasecraft is expected to be in



The Fairchild Leasecraft consists of the following major components: (1) support structure which interfaces with the Space Shuttle, and supports all of the Leasecraft components and payload modules; (2) standard multimission modules with independent structures, self-contained temperature control and electrical/data connection systems; (3) deployable/retractable solar arrays; (4) propulsion subsystem for orbit adjustments and control; (5) communications antennas for links to the Tracking and Data Relay Satellite System; and (6) additional support modules for secondary payloads.

excess of 10 years—including revisits to change out subsystem modules.

The Leasecraft operational system will consist of one or more spacecraft, spare modules and components, ground support and flight support systems and an operations control center.

The Space Shuttle will rendezvous with the Leasecraft for servicing of payloads or exchanging of packaged experiments. Anticipated payloads include materials processing equipment, remote sensing equipment and scientific experiments. Servicing of the Leasecraft would occur about every six months.

NASA's Office of Space Science and Applications will manage NASA's efforts under the agreement and provide technical support to the Leasecraft program.

Major Jet Fuel Savings With Energy Efficient Engine Technology

Major advances in aircraft jet engine efficiency have been achieved in a five-year research program conducted by the General Electric Co. for NASA's Lewis Research Center, Cleveland.

NASA and GE report that application of the new technologies can reduce aircraft fuel consumption by more than 18 percent (equivalent to a 15 percent reduction in engine specific fuel consumption) and reduce direct operating costs by 10 percent for aircraft of the late 1980s and 1990s when compared with current aircraft engines such as the GE CF6-50C model.

To put this in perspective, a one percent reduction in fuel usage would save U.S. airlines 100 million gallons per year or about $110 million in fuel costs.

Started in January 1978, the project has been virtually completed with full operational tests of a General Electric experimental engine that incorporates new designs for key components using technical advances perfected in the program.

Known as the Energy Efficient Engine Component Development and Integration Program (E3 for short), the project was a $206 million, cost-shared effort involving the independent development of advanced engine technology by both General Electric and Pratt & Whitney Aircraft Div. of United Technologies Corp. About 90 percent of the total funding for both contracts was provided by NASA and the balance by the two contractors.

Pratt & Whitney concentrated exclusively on developing the technology for a wide range of advanced components, with the end result being an extensive series of tests on each component or technology. GE, taking a different course, assembled its components for testing as an experimental engine system.

The GE engine recently completed 65 hours of operational testing at the company's test facility in Peebles, Ohio. Running the engine was the last major milestone in the GE program. The tests indicated that the experimental engine's specific fuel consumption reduction would be about 13.5 percent at the cruise condition as compared with the current CF6-50C commercial engine.

"Based on these results, achieving at least a 15 percent reduction in specific fuel consumption for a new, fully developed engine based on E3 technology appears highly probable," said Carl C. Ciepluch, project manager at Lewis. "During the normal qualification of a new engine for flight, thousands of test hours are required to assess mechanical durability. Usually performance improvements of several percent are obtained during these tests."

Originally, program objectives for the GE engine were a 12 percent reduction in specific fuel consumption, a 5 percent reduction in aircraft direct operating costs and a 50 percent reduction in the performance deterioration of engine components over the CF6-50C baseline engine.

Lewis and GE engineers indicate that technology from the E3 program can be used for future advanced turbofan, turboprop and turboshaft engines for both commercial and military uses.

Both GE and Pratt & Whitney engine makers have already incorporated some results of the program into engines now planned for production such as the GE CF60-80C model and the PW4000 and PW2037 models. Both companies are enthusiastic about long term potential.

The core of General Electric's engine has an all-new 10-stage compressor with a 23-to-1 pressure ratio. A two-stage high-pressure turbine incorporates advanced materials and aerodynamic design, and unique cooling techniques permit higher operating temperatures. Active clearance control, a low-emission combustor and a full authority digital electronic control are part of the new design.

"Larger, new engines still under development by industry do not have the pressure ratio now proven by the E3," Peter G. Batterton, assistant project manager at Lewis, said. (Pressure ratio is a gauge of engine efficiency potential comparable to the compression ratio of an auto engine.)

In addition to overall management responsibility, specific Lewis contributions to the project included work on exhaust gas mixing, compressor dynamics,

development of reduced emission combustors, thermal barrier coating for turbine blades and design of ceramic seals for the turbine.

Ciepluch said that the center's research on combustors led to the elimination of all visible smoke from the E3 engine and put it well within current government emission standards. He said that E3 also more than met noise limitation requirements.

"An important by-product of this program is that we have discovered additional ways to further improve the efficiency of turbofan engines. Indeed, we have not yet reached an efficiency plateau, rather a base for continuing research and development," he said.

"During the testing, the engine produced 37,415 pounds of thrust, exceeding the design maximum thrust goal of 36,500 pounds. Final testing on the engine consisted of a series of rapid accelerations and decelerations. Engine accelerations from flight idle to maximum takeoff power were achieved in as fast as 5.8 seconds with no engine instabilities. Decelerations from maximum power to flight idle were achieved in 13 seconds, also without instability. An engine-mounted, digital electronic computer control system was used for testing.

Numerous engine starts were made, each time adjusting the fuel schedule with the objective of reducing the starting time. The best engine start took less than 47 seconds from initiation of starter air to the ground idle condition. No compressor stalls or turbine overtemperatures occurred.

NASA Selects Small Business Research Proposals

NASA has selected 103 research proposals from small business, high technology firms under a new program established by the Small Business Innovation Development Act of 1982 (Public Law 97-219).

The program is aimed at stimulating technological innovation in the private sector, strengthening the role of small businesses in meeting NASA's research and development needs, and contributing to the growth and strength of the nation's economy.

The proposals were selected on their technical merit from among the 977 submitted to the aeronautics and space agency. Contract awards to the selected firms are expected to be made in approximately four to eight weeks. NASA's Fiscal Year 1983 budget includes $5 million for this program.

Projects funded by this program will be conducted in two phases. First, a six-month fixed-price contract effort to explore the feasibility of small business-proposed innovations and, if the results warrant, another contract for a second phase of up to two years duration to proceed further with the technological innovation. Work beyond the second phase would be funded either by commercial firms or by specific programs of government agencies.

In March 1984, NASA plans to issue a second solicitation for Phase I proposals in areas of research and development of interest to the agency. Small businesses with research and development capabilities and an interest in the NASA program can obtain a copy of the NASA 1984 SBIR solicitation, when it is released, by writing to the Small Business Innovation Research Office, Office of Aeronautics and Space Technology, Code RB-8, NASA Headquarters, Washington, DC 20546, asking to be added to the SBIR mailing list.

RCA Launch—The RCA Satcom IR communication spacecraft was successfully launched on a Delta 3924 launch vehicle from Launch Complex 17-B, Cape Canaveral Air Force Station, Fla., Sept. 8. The 24-channel advanced domestic communications satellite, built by RCA, will provide voice, data and video services to the continental United States and will provide up to 50 percent more communications capacity than the RCA Satcom II satellite that it will replace.

Patents for Inventions from NASA Research

The Office of General Counsel, NASA Headquarters, announces the following U.S. patents have been issued by the U.S. Patent Office and Trademark Office to NASA for inventions resulting from NASA research. Inquiries concerning them should be directed to the attention of the NASA Patent Counsel of the indicated installation.

Inventor(s) & Employer	Title	Patent No.	Installation
David A. Wolf, Dynatherm Corp, Cockeysville, Md.	Heat pipe thermal switch	4,402,358	GSFC
Curt H Liebert, NASA/LeRC	Covering solid, film cooled surfaces with duplex thermal barrier coating	4,402,992	LeRC
John S. Przybyszewski, Richard G. Claing, United Technologies Corp., Hartford, Conn.	Joining lead wires to thin platinum alloy films	4,402,447	LeRC
Mark C. Lee, Taylor C. Wang, Caltech/JPL, Pasadena, Calif.	Acoustic suspension system	4,402,221	NRO-JPL
Lo I. Yin, NASA/GSFC	Real-time 3-D X-ray and gamma ray viewer	4,404,469	GSFC
Frank J. Nola, NASA/MSFC	Motor power factor controller with a reduced voltage starter	4,404,511	MSFC

Expendable Launches for 1983

Name	Launch Date	Vehicle	Range	Mission Remarks
* IRAS	January 25	Delta	WSMC	Infrared astronomy. NASA scientific.
* NOAA-E	March 28	Atlas-F	WSMC	NOAA weather and SARSAT. Reimbursable.
* RCA-F	April 11	Delta	ESMC	RCA communications. Reimbursable.
* GOES-F	April 28	Delta	ESMC	NOAA weather. Reimbursable.
* Intelsat V-F	May 19	Atlas Centaur	ESMC	Intelsat communications. Reimbursable.
* EXOSAT	May 26	Delta	WSMC	European Space Agency. Reimbursable.
* Galaxy-A	June 28	Delta	ESMC	Hughes Communications, Inc. Reimbursable.
* HILAT	June 28	Scout	WSMC	Air Force research and development. Reimbursable.
* Telstar 3-A	July 28	Delta	ESMC	AT & T communications. Reimbursable.
* RCA-G	August 25	Delta	ESMC	RCA communications. Reimbursable.
* Galaxy B	September 22	Delta	ESMC	Hughes Communication, Inc. Reimbursable.
NAVY-21	December	Scout	WSMC	DOD transit. Reimbursable. Call up.

* Successfui launch

Note: At reader request, following is a brief explanation of terms used in the Launch Schedules: WSMC—Western Space and Missile Center, Vandenberg Air Force Base, Calif.; ESMC—Eastern Space and Missile Center, Cape Canaveral Air Force Station, Fla.; SMR—San Marco Range, off the east coast of Kenya, Africa; WFC—Wallops Flight Center, Wallops Island, Va.; KSC—Kennedy Space Center, Fla. *Reimbursable* expendable launches means that NASA is compensated or repaid for launch expenses incurred by the company or agency whose payload is launched. *Call up* indicates that the launch vehicle and spacecraft are in flight status and have been placed on standby, awaiting final preparations for launch based on the customer request for a launch time and date within a period of time not to exceed 120 days.

Space Shuttle Launches for 1983

Orbiter	Launch Date	Launch Number	Launch Site	Payload
* Challenger (OV-099)	April 4	6	KSC	TDRS-A
* Challenger (OV-099)	June 18	7	KSC	OSTA 2; SPAS-01 Telsat-F; Palapa B-1
* Challenger (OV-099)	August 30	8	KSC	INSAT 1-B; PFTA
Columbia (OV-102)	Nov. 28 (tent.)	9	KSC	Spacelab 1

* Successful launch

Another Dividend from Air and Space

Research and development in aeronautics and space have provided numerous benefits for all Americans—and at a tiny percentage of the tax dollar. Here is an example:

Airline Wheelchair

Some 700,000 people in the United States rely on wheelchairs for mobility. Few of them travel by air because of difficulties encountered at airports, in boarding airliners and particularly in mobility within the airplane.

Pictured at right is a prototype wheelchair which incorporates NASA technology. The chair was designed by the University of Virginia Rehabilitation Engineering Center with support from the National Institute of Handicapped Research and from Langley Research Center in Hampton, Va., which applied aerospace technologies in structural analysis and materials engineering. NASA's Research Triangle Institute Biomedical Applications Team, Research Triangle Park, N.C., coordinated the Langley/University of Virginia teamwork.

United Airlines has contracted for 15 units, to be built by Accutron Tool and Instrument Co., Hampton, Va.

Since weight is a factor in any item of equipment aboard a commercial airliner, the wheelchair had to be much lighter than conventional wheelchairs; it also had to be stable, durable, confortable and easy to handle. The Langley/University of Virginia prototype is made of Langley-furnished composite materials and weighs only 17 pounds, about one-third the weight of a standard wheelchair. It fits airliner aisles and can support a 200-pound person. Called the "Stowaway," it can be folded and stowed when not in use.

* NASA does not endorse commercial products developed as a result of its Technology Utilization or Patent Licensing Programs, but it does encourage the widest possible use of its technology.

NASA
National Aeronautics and Space Administration